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PATENT

VEHICLE HEADREST

Field of the Invention

The field of the present invention is that of seat headrest arrangements and methods of utilization thereof.

Background of the Invention

Headrests are known in the vehicle seating art. Examples of vehicle seat headrests can be found by review of Duvenkamp US Patent 4822102 and Denton US Patent 4762367.

The present invention provides a vehicle seat headrest arrangement which provides an alternative to the aforementioned patents with special unique advantages to be explained later herein.

Brief Description of the Drawings

Figure 1 is a perspective view of a preferred embodiment according to the present invention.

Figure 2 is an enlarged view of the headrest shown in Figure 1 with portions of the seatback cushion removed for clarity of illustration.

Figures 3 and 5 are side views illustrating operation of the headrest shown in Figures 2 and 4, respectively.

Figure 4 is a perspective view of an alternate preferred embodiment of the present invention.

Description of the Preferred Embodiments

Referring to Figure 1, the vehicle seat and headrest arrangement 7 of the present invention has a seat bun frame 3. The seat bun frame 3 has fore 5 and aft 9 ends generally positionally aligned with the fore and aft segments of the vehicle in which the seat and headrest arrangements 7 is placed. Joined to the seat bun frame 3 generally adjacent its aft end 9 is a seatback frame 2. The seatback frame 2 is generally in the shape of an inverted U having two risers or sides 22 joined by a cross frame member 4. Typically, the seat bun and back frames 3, 2 4 will be made from steel, metallic or other structural members.

Providing a surface for contact with the head of a vehicle seat occupant is a headrest cushion 6. The headrest cushion 6 has extending therefrom two posts 8. An impact target or plate 10 is pivotally mounted to the cross member 4 along a fixed pivotal axis 13 generally perpendicular to the fore and aft direction of the vehicle. The plate 10 has two formed alignment members 12 for each respective post 8 for mounting of the headrest cushion 6 to the seatback frame 2. The headrest posts 8 are adjustable vertically with respect to the plate 10 in a manner conventional for that of vehicle seat headrests.

The plate 10 mentioned previously is pivotally mounted with respect to the cross member 4 by virtue of its clamped ends 14. The clamped ends 14 are joined to the cross member 4 by the use of a metal clip 16 which has flanges 26 that pop into apertures 15 (only one shown) of the clamped end 14. To stabilize the headrest cushion 6 in position and to prevent its rotation except at a threshold amount of force, there is a spring 18 which wraps around the intersection of the risers 22 with the cross member 4. The spring 18 extends downwardly and is held to the plate 10 by clips 20. Rearward loading of the plate 10 will cause the headrest cushion 6 to pivot toward the head of a seat

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occupant. The loading required for pivotal movement of the headrest cushion 6 can be set to occur only during an instance where a vehicle seat occupant is seated in the seat and the vehicle undergoes acceleration due to a rear impact-type situation. Alternatively, the spring 18 can be configured or sized to be easily movable at lower pressure levels and then plastically deform under predetermined loads representative of a rear impact-type situation. The pivoting of the headrest cushion 6 forwardly also has a beneficial effect of raising the relative height of the headrest 6 with respect to the seat bun frame from a height of 17 to 19 as shown in Figure 3.

Referring additionally to Figures 4 and 5, an alternate preferred embodiment of the present invention is brought forth with similar items providing the same function given like numerals as that shown in Figures 1 through 3. In Figure 4, the posts 30 are held to the cross member 4 by penetration through an elastomeric bushing 42 which is mounted in a clip 32 which is fitted on the cross member 4. The posts additionally extend downwardly, having loop sections 44 which are directed by two angular cam guides 46 which have a generally downward slope projecting generally forwardly. The impact plate 34 is attached with the post by four clips 48. A spring 18 biases the headrest cushion 6 against rotation by contact with the post 30.

A force placed upon the plate 34 causes the posts 30 to have a variable axis of rotation with respect to the cross member 4 since the cam guides 46 will cause the posts 30 to rise upwardly after a sufficient force has been imparted to the plate 34. Also, the interaction of loop sections 44 with the cam guides 46 will cause the headrest cushion 6 to be rotated slightly forwardly (Figure 5).

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Upon a sufficient push on the plate 34, the posts have an axis of rotation noted as 51. On a rear impact of sufficient magnitude, the posts 30 will be translated upward with respect to the clips 32, placing the headrest cushions 6 in a higher and more forward position. The axis of rotation 51 will be constant with respect to the clips 32. However, the projection of the axis of rotation on the post 30 at the initial impact will be translated to point 53 due to the extending upward motion of the posts 30. A-1

In normal vehicle seat and headrest arrangements, during the initial stages of a rear impact, the occupant's torso is in contact with the seatback but the head is several inches forward of the headrest. This condition is consistent with the body being reclined at about 20 degrees from vertical with the neck being approximately vertical. In contrast, the seat is usually at a reclined angle of approximately 25 degrees from vertical, and the headrest either follows the contour of the seatback or curves slightly forward. However, for seating comfort, the head is usually not in contact with the headrest while driving. As the occupant loads the seatback in a rear impact, force builds up behind the torso and buttocks of the seat occupant. Depending upon the compliance of the seatback, the occupant compresses into the cushion but the head, neck and torso move in unison. Typically, there is a greater compression in the buttocks region of the seat occupant, with a gradual reduction up to the shoulder level as the body remains upright. The more severe the crash, the greater the compression of the occupant into the seatback. As this action is occurring, the initial load of the occupant attempts to deflect the seatback rearwardly. The amount of deflection is related to the bending stiffness of the seatback. However, the seatback may possibly deflect under the torso load prior to the head and neck of the occupant contacting the headrest. Therefore, in a

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conventional seat, there may exist a gap between the head and headrest in the crash situation. In the present invention, the force of the occupant's torso being cast into the seat causes the impact plate 34 or 10 to cause the headrest cushion 6 to rotate toward the vehicle occupant. The greater the rear crash acceleration, the greater the resultant force on the seat occupant and the greater the forward rotation and outward movement of headrest 6. An additional advantage is found in the embodiment shown in Figures 4 and 5 in that the headrest cushion 6 (and post 30) moves upwardly, thereby increasing the relative height or outward position of the headrest cushion 6 with respect to the seat occupant's head and minimizing any possible gap between the head and the headrest cushion 6. The above action of the headrest cushion 6 provides a more idealized condition for taller seat occupants.

While this invention has been described in terms of preferred embodiments thereof, it will be appreciated that other forms could readily be adapted by one skilled in the art. Accordingly, the scope of this invention is to be considered limited only by the following claims.

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